

Length from the occipital crest to the end of the premaxillaries, .....	10·25,	10·85
„ from the anterior border of the foramen magnum,...	9·85,	8·55
„ of the bony palate from the opening of the posterior nares to the extremity of the premaxillaries, .....	4·7,	4·5
„ of the upper molar series, .....	2·6,	2·85
Breadth of palate between last molars,.....	1·63,	1·69
„ between anterior premolars,.....	1·13,	1·0
„ of the fossa between the pterygoid processes, .....	0·5,	0·75
Greatest width of skull at posterior border of orbit, .....	5·3,	5·6
Length of horns along the curve, .....	35·75,	29·5
Circumference of ditto at base, .....	9·0,	10
Width from tip to tip of horns in a straight line, .....	16·5,	5·4
Greatest breadth of horn at base, .....	2·25,	2·45
Greatest depth of horn at base, .....	3·25,	3·25
Width of forehead between orbits, .....	3·5,	3·8

The lower part of the forehead at the nasal suture and the whole of the frontals are more raised and convex than in either *O. cycloceros*, or *O. Vignei*.

The frontal ridge between the bases of the horns is less developed in *O. Blanfordi*, and in this latter the posterior convex margin of the bony palate is differently shaped, being more pointed and not nearly semicircular as in *O. cycloceros*.

Although this was promised me, I have not, I regret to say, as yet received any skin of this sheep; but I should hope that the dimensions above given, accompanied by an accurate drawing, would suffice to enable other observers to identify this supposed new species.

XVII.—*Catalogue of the recorded Cyclones in the Bay of Bengal, up to the end of 1876, compiled by HENRY F. BLANFORD, Meteorological Reporter to the Government of India.*

The following list was drawn up with a view to ascertaining with greater accuracy than had previously been practicable, what is the distribution of cyclones at the different seasons of the year, and also what parts of the Bay are most liable to storms, in each season of the year. The general results arrived at on these heads have been announced in my lately published work “The Indian Meteorologist’s Vade Mecum.”

The basis of the present catalogue has been furnished by the two lists published by Dr. Buist in Vols. xii and xiv, of the Transactions of the Bombay Geographical Society, and that given by Mr. Piddington in the Sailor's Horn Book,\* accompanying a chart of the storm tracks. To these I have added a considerable number of storms, notices of which I have gathered from other sources, and also those recorded in recent years in the Reports of the Meteorological Department. A few evident errors in Dr. Buist's catalogues (possibly arising from misprints) have been corrected, and attention has been drawn to some doubtful cases.

The several authorities referred to are designated in the Catalogue by the following symbols :

B. I.	Buist's first catalogue.	Trans. Bombay Geog. Soc. Vol. xii. App. A.
B. II.	ditto second ditto	ditto ditto ditto ditto xiv. p. 19.
P. I-XXV.	Piddington's Memoirs in Journ. As. Soc. Bengal.	
PHB.	ditto	Sailor's Horn Book of Storms.
AAR.	Asiatic Annual register.	
O.	Orme's History of the Military transactions in Hindostan.	
C.	Capper's Winds and Monsoons.	
HID.	Horsburgh's Indian Directory.	Taylor's Edit. 1874.
G. & T.	Goldingham and Taylor.	Madras Met. Register 1822-1843.
SGMA.	Surveyor General's Meteor. Abstracts for Calcutta 1840-77.	
MJ.	Madras Journal.	
L.	Dr. Liebeg in the J. As. Soc. Bengal 1858.	
PRS.	Proc. Royal Soc. London.	
BMR.	Bengal Meteorological Reports.	
G. & B.	Gastrell and Blanford.	Report on Calcutta Cyclone 1864.
W. Rep.	W. G. Willson's Special Reports on Cyclones.	
E. Rep.	J. Eliot's	ditto ditto ditto.
Auct.	The Author from private notes.	
AJ.	Asiatic Journal.	
T.	Col. Thuillier in Journ. As. Soc. Bengal.	Vol. xvii. p. I.

\* Also in Vol. xvi, part 2 of the Journal of the Asiatic Society of Bengal.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
I	1737	Oct.	7th	A violent earthquake and furious hurricane at the mouth of the Ganges; reached 60 miles up the river. 20,000 craft of all descriptions destroyed. 300,000 people said to have perished in Lower Bengal or in the Gulf. The river rose 40 feet above its usual level.*	PHB. p. 225.
II	1747	Oct.	2nd	Six French men of war blown out of Madras roads by a hurricane; one foundered and 4 dismasted. Twenty other vessels driven ashore or lost at sea. Storm not felt at Pondicherry.	O. C. p. 57. B. 1.
III	1749	Apl.	13th	A furious hurricane on the Coromandel Coast. English camp at Porto Novo blown down. Two Indiamen stranded. The <i>Apollo</i> hospital ship, <i>Pembroke</i> 60 guns, and <i>Namur</i> 74 lost.	O. C. p. 62.
IV	1752	Oct.	31st	Violent hurricane on the coast of Madras. Rain that fell continuously for several days laid the whole country under water.	O. C. p. 58.
V	1760 1761	Dec. Jan.	31st & 1st	Cyclone at Pondicherry during the siege. Central calm passed over the town at midnight of New Year's eve.	O. C. p. 58.
VI	1763	Oct.	21st	Madras. All vessels at anchor in the roads lost.	C. p. 59.
VII	1768	Oct.	29th	Madras. <i>Chatham</i> Indiaman lost in the roads. Storm not felt at Pondicherry.	C. p. 60.
VIII	1782	Oct.	20th	Madras. More than one hundred country vessels stranded.	HID.
IX	1787	May	19th & 20th.	Great storm and storm wave inundation at Coringa; penetrated 20 miles inland. Estimated that 20,000 souls and 500,000 cattle perished.	AAR. 1788. PHB. p. 195. B. 1.

\* These estimates are in all probability greatly exaggerated, as will readily be believed by any person acquainted with the character of Indian statistics, even at the present day. The loss of life in the Backergunge cyclone of November 1876, was eventually found to be only about half the original estimate, although this latter was based on an actual enumeration of a certain number of villages, and had been framed with comparative caution.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
IX	1789 ?	Dec.	?	A great storm wave inundation at Coringa. Accounts collected by M. de la Place in 1840. [Perhaps the same as the preceding. H. F. B.]	PHB.
X	1792	Oct.	26th & 27th.	At Madras. No details given.	B. I.
XI	1797	June	18th to 20th.	At Madras. No details.	B. I.
XII	1797	Nov.	?	In north of Bay. Recorded by H. C. S. <i>Minerva</i> .	PHB.
XIII	1800	Oct.	19th.	Furious hurricane and earthquake at Ongole and Masulipatam. Many houses at Ongole shaken down.	B. I. PHB. p. 226.
XIV	1800	Oct.	28th.	Hurricane at Coringa and Masulipatam.	B. I. PHB.
XV	1803	Dec.	4th.	H. M. S. <i>Centurion</i> experienced a violent hurricane between Trincomalee and Madras.	HID.
XVI	1805	Jan.	7th.	At Trincomalee and on Coromandel Coast and across peninsula to Tellicherry on the Malabar Coast.	AAR. 1808. B. I.
?	1805	Mar.	16th.	Calcutta and Lower Bengal [Doubtful if this were a cyclone from the Bay. H. F. B.]	B. I.
XVII	1807	Dec.	10th & 11th.	Madras. The sea breached the fort and walls of the Black town. Storm not felt to north of Puclicat, nor at Pondicherry.	B. I. HID. AAR. x. 129.
XVIII	1808	Sept.	5th & 6th.	Cyclone at Vizagapatam. 20 country ships driven on shore.	AAR. x. 153.
?	1808	Dec.	12th.	Madras and South Coromandel Coast. Great loss of life and shipping. [Probably a mistake, being a repetition of XVII H. F. B.].	B. I.
XIX	1811	May	3rd.	Madras. Destroyed nearly every vessel in the roads. Ninety native vessels wrecked. The <i>Dover</i> frigate and store ship <i>Manchester</i> run ashore and wrecked.	B. I. HID.
XX	1818	Oct.	23rd & 24th.	Madras. Centre of cyclone passed over the town.	B. I. AJ. May 1819.
XXI	1820	Mar.	29th & 30th.	Madras [and Kistnapatam?]	B. I. PHB. p. 55.



No.	Year.	Month.	Days.	Details of Storm.	Autho- rity.
XXII	1820	May	8th.	Madras and also on Malabar coast. Occasioned some loss of shipping south of Bombay.	B. I. PHB. p. 56, 95.
XXIII	1822	June	?	Storm wave swept over Burisal and Backergunj. 50,000 souls said to have perished. Storm travelled only 53 miles in 24 hours.	B. I. PHB p. 56.
XXIV	1823	May	26th.	From the north of the Bay over Balasore. The <i>Liverpool</i> and <i>Oracabessa</i> storm. Six large ships wrecked.	B. I. PHB p. 56.
XXV	1823	June	2nd.	Chittagong and Delta of Ganges.	B. I.
XXVI	1824	June	8th.	Chittagong. Heavy inundations causing immense loss of life and property.	B. I. P. XXII.
XXVII	1827	May	7th to 10th.	Madras. Several native vessels driven on shore, and the <i>David Scott</i> parted her chain cables. Lowest bar. at Madras 29·76.	G. & T.
XXVIII	1830	May	26th.	Cyclone apparently passed at sea northwards. A fresh or light gale at Calcutta. Lowest bar 29·008.	T.
XXIX	1830	Dec.	2nd.	A gale of the most violent description at Pondicherry and Cuddalore, whereby the stoutest trees were laid low, houses unroofed and many lives lost. At Madras, wind approached to a gale at 8 or 9 P. M.	G. & T.
XXX	1831	Oct.	31st.	Balasore and Cuttack. Inundation swept away 300 villages and at least 11,000 people. Famine followed and total loss of life estimated at 50,000 souls.	B. I. PH B. p. 56. AJ. 1832 & 1833,
XXXI	1831	Dec.	6th.	Pondicherry and Cuddalore. Lasted a few hours only but fearfully destructive.	B. I.
XXXII	1832	May	21st.	In Gangetic delta 8000 or 10,000 people drowned.	B. I.
	1832	Aug.	4th.	Furious hurricane at Calcutta. Bar. 28·8 [not mentioned in Col. Thuillier's list of storms at Calcutta; possibly an error for that of 3rd August 1834. H. F. B.]	B. I.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
XXXIII	1832	Oct.	7th.	A fresh or light gale at Calcutta.	T.
XXXIV	1833	May	21st.	At mouth of Hooghly. H. C. S. <i>Duke of York</i> stranded on a paddy field $2\frac{1}{2}$ miles south of Hidjillee. Bar. at Calcutta 29·032. Storm did not reach to Balasore.	TB. I. PHB. p. 56, 273.
XXXV	1834	May	?	At Khyouk Phyoo on Arakan coast.	PHB.
XXXVI	1834	Aug.	3rd.	At Calcutta blew a gale with incessant rain. Bar. 29·028. Rain 5·30 ins.	T.
XXXVII	1836	Oct.	30th.	Madras. Central calm passed over the town and lasted a quarter of an hour. Lowest bar. 28·285.	G & T. B. I. PHB. p. 56.
XXXVIII	1838	Oct.	19th.	At Kedjiri in the Hoogly estuary. Bar. at Calcutta 29·398.	T. [56. PHB. p.
XXXIX	1838	Nov.	?	At Khyouk Phyoo.	PHB. p.
XL	1839	June	3rd to 5th.	Traversed the top of the Bay from ENE to WSW. ? [This course seems very doubtful. On the data given, I should put the centre on the 3rd and 4th in positions very different from those adopted by Mr. Piddington. The course was more probably from SE to NW to near Pooree. Prof. Dove has been misled by the original error. See <i>Klimat. Beitr.</i> i. p. 213. H. F. B.]	P. I. [56.
XLI	1839	Sept.	19th to 21st.	Passed northward across Sunderbuns, between Calcutta and Burrisaul, to near Rungpore. Lowest bar. at Calcutta 29·200 with N. wind.	P. II. T.
XLII	1839	Nov.	12th to 17th.	Across the Bay from the Andamans to Coringa. A storm wave laid the shore 8 ft. under water. 70 vessels and 700 souls lost at sea. 6,000 said to have been drowned on shore.	P. II. B. I.
XLIII	1840	April May	27th to 1st.	Andamans to the Orissa coast. Felt at Calcutta, where lowest bar. was 29·42. Centre passed just South of Pooree.	P. III. B. I. T. I.

No.	Year.	Month.	Days.	Details of Storm.	Autho- rity.
XLIV	1840	May	?	Hurricane off Madras and South- ern coast.	B. I.
XLV	1840	Nov.	21st.	To the NE of Andamans.	P. II.
XLVI	1841	May	16th.	From the SW of the Anda- mans to Madras. A lull in the middle of the storm at Madras Bar. 29·069.	P. v. G. & T. B. I.
XLVII	1842	May June	31st to 5th.	Great Calcutta cyclone on 3rd June. "The most severe gale ever felt at Calcutta." Bar. 28·278. Centre passed over the city.	P VIII. T. SGMA. B. I.
XLVIII	1842	Oct.	2nd to 5th.	Across the north of the Bay, in a NW direction to Cuttack. Also felt at Gya and Patna on the 6th.	P IX. B. I.
XLIX	1842	Oct. Nov.	22nd to 1st.	From the Andamans westward to Pondicherry and across In- dia to the Arabian Sea. Thence westward to E. Long. 60° a total course of 2000 miles. Average rate of travelling 12·4 miles per hour across the bay, and 5·6 miles afterwards.	P VIII. B I.
L	1843	May	19th to 23rd.	From South of bay, NW to Ongole. Bar. at Masulipatam 28·73. The place inundated by the sea. Bar. at Bombay fell 0·2 from 18th to 23rd.	P x.
LI	1843	Nov. Dec.	28th to 2nd.	From N. lat. 6° E. long. 90° in NW direction. Did not reach land. Another storm simul- taneously in lat. 7°—8° and same long, south of the equator.	P XI.
LII	1844	May	11th.	Noakhally and Chittagong.	P XII.
LIII	1844	Aug.	21st.	Blowing a gale at Calcutta from 9 P. M. to the following morn- ing. More than 12 ins. of rain fell. Bar. at sunset, be- fore the gale 29·350. [Not mentioned by Piddington but appears to have been a cyclone. H. F. B.]	T. SGMA.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
LIV	1844	Nov.	9th to 14th.	East of the Andamans. Encountered by the <i>Briton</i> and <i>Runnymede</i> troop ships. Both dismasted and thrown on Andamans.	P. XII.
LV	1845	Nov. Dec.	29th to 2nd.	From South of bay, westward to Ceylon. Centre passed near Batticuloa. On the 3rd a magnetic storm observed at Bombay.	P. XIV. B. I.
LVI	1846	Sept.	21st.	A gale at night at Calcutta. Bar. at sunset before gale 29.475.	T. SGMA.
LVII	1848	April	23rd.	Violent hurricane off Ceylon, in which H. M. brig <i>Jumna</i> was nearly lost.	B. I.
LVIII	1848	July	15th.	Sandheads. Ship <i>Nussur</i> foundered.	P. XXII.
LIX	1848	Oct.	12th to 14th.	In north of Bay where it was generated. Travelled NW to False Point. Centre passed over light-house.	P. XVIII.
LX	1849	May	12th to 13th.	Chittagong. Lowest (used) Bar. 28.40.	P. XXII.
LXI	1849	Dec.	10th.	Severe hurricane at Madras. Ships <i>Lady Sale</i> , <i>Industry</i> and <i>Princess Royal</i> lost.	B. I.
LXII	1850	April	23rd to 28th.	Cyclone formed to west of Nicobars passed northward to Bengal, between Midnapore and Calcutta and over Moorshedabad, on nearly the same track as that of 1864, but a little more westerly.	P. XX.
LXIII	1850	Nov.	17th to 19th.	In Andaman Sea. Formed east of Port Blair and travelled NNW.	P. XXII.
LXIV	1850	Dec.	4th.	Hurricane at Madras. Two ships and 18 country craft wrecked.	B. I.
LXV	1851	April May	30th to 6th.	From the NE of Ceylon to Madras. Passed to north of town. Lowest bar. 29.322 with wind from SW.	P. XXI. B. I.
LXVI	1851	Oct.	20th to 23rd.	In north of Bay. Centre passed over False Point light-house and thence NE by N. in direction of Dacca. Lowest bar. at False Point 28.21.	P. XXIII. B. I.



No.	Year.	Month.	Days.	Details of Storm.	Autho- rity.
LXVII	1852	May	12th to 15th.	From lat. 15° course due North to Sunderbuns. Centre passed 39 miles East of Calcutta. Two river steamers in Sunderbuns carried to middle of jungle. Much damage in Calcutta.	P. xxiv. B. I.
LXVIII	1853	Mar.	26th to 28th.	Furious hurricane in Southern India. Some 50 vessels sunk or wrecked on the Coromandel coast, South of Madras.	B. I.
LXIX	1854	April	21st to 23rd.	A violent hurricane in Gulf of Martaban and at Rangoon.	P. xxv. B. I.
LXX	1854	Oct.	6th.	Hurricane South of Ceylon.	B. I.
LXXI	1855	May	15th to 29th.	Bay of Bengal between Burmah and Madras.	B. II.
	1856 ?	May	14th.	In Bay of Bengal. [This rests on Buist's authority only. A gale is recorded at Calcutta on this day, but it was only a violent hail-storm. H. F. B.]	B. II. SGMA.
LXXII	1856	Sept.	3rd.	Calcutta. Lowest bar. 29·156.	SGMA.
LXXIII	1856	Nov.	17th to 21st.	Bay of Bengal 5° to 20° North. Felt at Madras.	B. II. MJ. 1856
LXXIV	1857	Oct. Nov.	28th to 2nd.	Off Ceylon. Central calm passed over Nellore. Many houses and trees blown down.	B. II. MJ. 1857.
LXXV	1858	April	9-10th.	From Andamans to Cape Negrais. Much destruction at Henzada and Rangoon, between which the centre passed.	L. B. II.
LXXVI	1858	May	15th to 20th.	Bay of Bengal across to Malabar coast. Also Chittagong at Dacca.	B. II.
LXXVII	1858	Oct.	25th & 26th.	At Calcutta. Lower bar. 29·291.	B. II. SGMA.
LXXVIII	1859	April	21st to 27th.	Bay of Bengal and also the Andaman Sea. Prevailed with greatest violence in the neighbourhood of Negapatam. 15 to 20 inches rain over Tanjore.	B. II. MJ. IV.
LXXIX	1859	June	12th to 17th.	Bay of Bengal off Akyab.	B. II.
LXXX	1859	July	25th to 27th.	Calcutta. Lowest bar. 28·179. Incessant rain. No thunder or lightning.	B. II. SGMA.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
LXXXI	1864	Oct.	2nd to 5th.	From NW of Andamans to Bengal. Storm wave in Hooghly swept away 48,000 souls and upwards of 100,000 cattle. Nearly all the shipping in the river stranded. P. and O. mail steamers <i>Bengal</i> and <i>Bentinck</i> hulk landed high and dry on fields. All trees stripped of their leaves. Lowest bar. at Calcutta 28·570,	G. & B.
LXXXII	1864	Oct.	25th.	North of Bay of Bengal.	G. & B.
LXXXIII	1864	Nov.	5th.	Masulipatam Cyclone.	G. & B.
LXXXIV	1865	Nov.	?	E. of Ceylon.	G. & B.
LXXXV	1867	Sept.	30th.	Vizagapatam Cyclone.	Auct.
LXXXVI	1867	Oct. Nov.	27th to 2nd.	From near Nicobars to Bengal. Passed East of Calcutta over Port Canning.	BMR. PRS.
LXXXVII	1867	Nov.	12th.	In north-east of bay.	Auct.
LXXXVIII	1868	Nov.	?	Cyclone at Akyab.	Auct.
LXXXIX	1869	May	1st.	In NE of Bay. <i>Moulmein</i> steamer involved.	BMR. 1869.
XC	1869	May	13th to 17th.	From Cape Negrais to NW across Bengal.	BMR. 1869.
XCI	1869	June	5th to 10th.	North of Bay and across Bengal.	BMR. 1869.
XCII	1869	Oct.	7th & 8th.	From NE of bay, across Midnapore, Purulia and Gya to Benares.	BMR. 1869.
XCIII	1870	Jan.	10th & 11th.	South of bay, midway between Ceylon and Nicobars.	BMR. 1870.
XCIV	1870	May	30th.	In NE of bay. Encountered by steamer <i>Moulmein</i> .	BMR. 1870.
XCV	1871	?	?	Near Pondicherry.	BMR.
XCVI	1872	April May	29th to 3rd.	Severe cyclone passed over Madras. Formed about 7° 30' N. lat. Felt at Calicut and affected the barometer at Bombay.	1871. BMR. 1872.
XCVII	1872	June July	28th to 1st.	A small storm generated in the north of the bay passed over Balasore.	W. Rep. BMR. 1872.
XCVIII	1872	Sept.	11th.	A small local cyclone in NE of Bay.	BMR. 1872.
XCIX	1872	Sept.	19th & 20th.	From north of bay, northwards across Jessore.	BMR. 1872.
C	1872	Oct.	24th to 26th.	Cyclone passed over Narcondam island levelling the forest.	BMR. 1872.

No.	Year.	Month.	Days.	Details of Storm.	Authority.
CI	1873	Nov.	3rd.	Severe cyclone encountered by the <i>Foam</i> in N. lat. $15^{\circ} 30'$ , E. long. $85^{\circ}$ .	BMR. 1873.
CII	1874	May	3rd to 5th.	Cyclone at Madras. Originated about N. lat. $9^{\circ}$ , E. long. $85^{\circ}$ . Broke up before reaching land.	BMR. 1874.
CIII	1874	June	15th to 17th.	Small cyclone in NW of bay.	BMR. 1874.
CIV	1874	July	28th & 29th.	An incipient cyclone in NW of bay.	BMR. 1874.
CV	1874	Aug.	1st & 2nd.	Crossed the north of the bay from near Akyab to WNW.	BMR. 1874.
CVI	1874	Oct.	13th to 16th.	Originated between $13^{\circ}$ and $17^{\circ}$ N. lat. Crossed to NW of bay and passed over Midnapore and Burdwan. Bar. at Sandheads in central calm 27.58.	W. Rep. BMR. 1874.
CVII	1874	Oct.	24th to 26th.	Cyclone felt at Coconada.	BMR. 1874.
CVIII	1874	Nov.	1st & 2nd.	Second cyclone at Coconada. Did not reach land.	BMR. 1874.
CIX	1874	Nov.	10th to 12th.	Encountered by Meinam between lat. $17^{\circ}$ and $19^{\circ}$ .	BMR. 1874.
CX	1874	Dec.	10th to 12th.	Storm in the South of the bay.	BMR. 1874.
CXI	1876	Oct.	5th to 8th.	Vizagapatam cyclone. Found to West of Andamans in N. lat. $15^{\circ}$ , reached Vizagapatam on 8th and passed up the margin of East	J. E. Rep.
CXII	1876	Oct. Nov.	29th to 1st.	The Backerganj cyclone. Formed near Andamans and moved north to mouth of Megna, the islands of which were swept by storm wave, and upwards of 100,000 people drowned.	J. E. Rep.